

LONG-EARED OWL (*Asio otus*)

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Criteria Scores

Population Trend	Range Trend	Population Size	Range Size	Endemism	Population Concentration	Threats
15	5	7.5	5	0	0	15

Special Concern Priority

California: Currently ranked as a Bird Species of Special Concern, Priority 2. Considered a Bird Species of Special Concern (Remsen 1978), Bird Species of Special Concern list update (Anonymous 1992), and on the list of Special Animals (CDFG 2001).

Federal: None

Other: None.

Breeding Bird Survey Statistics for California

Data inadequate for trend assessment (Sauer et al. 2000). Detected during BBS surveys along 22 routes between 1966 and 1996 in the northeast, high desert (Inyo and Mono counties) southern Sacramento and northern San Joaquin valleys, and eastern San Bernardino, Riverside, and Imperial counties.

General Range and Abundance

Broadly distributed in the northern hemisphere temperate climatic zones in North America and Eurasia between 30° and 65 ° N latitude (Marks et al 1994). In North America, year-round resident in southern and central Canada (except west coast); in northern tier states in eastern and western United States, and south through Arizona and New Mexico in the west. With the exception of the southern California coastal plain (see below) and Maine, absent from the coast (Marks et al 1994). Winter range extends beyond year-round range south into central and eastern Mexico and Central America and throughout southern tier states except Florida and coastal Louisiana, Georgia,

Alabama, and South Carolina. Northern-most breeding range largely unoccupied in winter (Marks et al 1994). Occurrence in central, western, and west coastal Mexico well established by museum and literature records (Enriquez-Rocha et al 1993).

Wintering birds comprised of both residents and short- and long-distance migrants in most areas and long-distance migration (e.g., Canada to Mexico) well established (Enriquez-Rocha et al 1993, Houston 1966). Migration poorly understood but seasonal movements in U.S. suggest regular migration patterns (Duffy and Kerlinger 1992, Russell et al 1991, Slack et al 1987).

North American population comprised of two subspecies; *A. o. wilsonianus* in the east and *A. o. tuftsi* in the west (California) (Sibley and Monroe 1990).

Seasonal Status in California

Winter resident throughout most of California. Breeds along central and south coast, northeast, and desert regions. (Bloom 1994, Sauer et al 1996, Sauer et al 2000, Unpub. County Bird List Data).

Fall and winter population likely augmented by migrants (Marks et al 1994) with greatest augmentation in the desert regions and Sacramento Valley (Unpub. County Bird List Data).

Historical Range and Abundance in California

Little data on historic range and abundance available. Grinnell and Miller (1944) indicated “numbers so large as to warrant term ‘common’, even ‘abundant’ locally” suggesting high abundance in suitable habitat. The historic range included the entire length of the state east of the coast range with centers of abundance noted in the northeast Great Basin habitats, the Central Valley, and in coastal southern California (Grinnell and Miller 1944).

Bloom (1993) conducted a thorough search of the literature and museum records for distribution within Orange and northern San Diego counties and compared these data to breeding records recorded in the same area between 1968 and 1992. He concluded breeding territories had decreased by at least 55% leaving a small, remnant population in the interior portions of these counties. Most extirpated sites were in coastal and central San Diego County. Loss of grassland

habitat to urban, industrial, and recreational uses in the southern California coastal region has been implicated or documented as a decline factor in other grassland species (Knopf 1994) and may reflect a local phenomenon.

Recent Range and Abundance in California

The following description of the Long-eared Owl range in California is based on sighting information from the BBS, CBC, Breeding Bird Atlas efforts, and county bird lists.

Summer: Occurs in oak woodland, mixed hardwood conifer, or riparian habitats primarily along the margins of the southern Sacramento and northern San Joaquin Valleys (Unpubl. Alameda County Breeding Bird Atlas Data, Unpubl. County Bird List Data); mixed hardwood-conifer, conifer and juniper woodlands in the northeast (eastern Lassen, Modoc, and Siskiyou counties); in mixed conifer, riparian, and juniper woodland habitats of the western high desert region of Inyo and Modoc counties (Shuford and Metropulos 1996); in oak woodland and mixed hardwood-conifer habitats of the western deserts of Kern, San Bernardino, and Riverside counties (Unpubl. County Bird List Data); in oak and riparian woodland habitats in coastal and inland Marin, Santa Cruz, Monterey, San Luis obispo, Santa Barbara, Ventura, Orange, Los Angeles, Orange, and San Diego counties (Bloom 1994, Unpubl. Los Angeles County Breeding Bird Atlas Data, Unpubl. San Diego County Breeding Bird Atlas Data, Unpubl. Orange County Breeding Bird Atlas Data, Unpubl. County Bird List Data); and riparian woodland habitats in eastern Riverside county.

Winter: Range extends throughout every county in the state (Unpubl. County Bird List Data). Considered an uncommon wintering species in the northern Sacramento Valley (Colusa and Glenn counties), the northeast and eastern Sierra Nevada region (Plumas, Sierra, Inyo, and Mono counties), and coastal and inland southern California (Los Angeles, Riverside, and San Bernardino counties). Considered either occasional or rare in the remaining counties and apparently least abundant along the north coast, northern San Joaquin and southern Sacramento counties (Unpubl. County Bird List Data).

Little information available on population trends or regional abundance and no estimate on North American population available (Marks et al 1994). Declines in California populations are suspected (Marti and Marks 1989) but trends are based largely on qualitative and anecdotal information (Marks et al 1994). Population estimates not available for California. Described as “common to abundant” by Grinnell and Miller (1944) which, when compared to current county bird list ratings primarily reflecting uncommon to occasional, offers the best evidence of a decline in the California population. Christmas Bird Count data trend analyses for the period 1959 – 1988 (Trend 2.4, $n=53$, $p<0.05$) indicate an increasing trend which is in stark contrast to the decreasing trend indicated for the remaining 19 states in which CBC data were adequate to produce trends (Sauer et al 1996).

Marks et al (1994) warn against assuming declining trends based on apparent local extirpation because they may be masked by highly variable distribution within the known range due to nomadic behavior as this species responds to prey availability. Some authors have suggested, however, that Long-eared Owl distribution may be influenced by conversion of grasslands to other uses resulting in reduced prey species upon which they depend (Bosakowski et al 1989, Marks et al 1994).

Despite evidence that this species may be more opportunistic in its foraging and roosting habits than past studies indicate (See Bull et al 1989), the Long-eared owl is primarily a grassland species and requires grasslands or meadows in close proximity to breeding and roosting areas (Bloom 1994, Knight and Erickson 1977, Marks et al 1994, Randle and Austing 1952). Indirect evidence of decline for this species is the substantial loss of grassland habitat in California and subsequent decline of grassland associated species (Knopf 1994).

Ecological Requirements

As stated above, the Long-eared Owl is primarily a grassland species which uses adjacent dense tree vegetation for foraging and roosting. Nests in conifer, oak, riparian, and juniper woodlands usually

with dense canopy cover (Marks et al 1994). Secondary nesting is common and use of Cooper's Hawk, Common Raven, American Crow, and Swainson's Hawk nests has been documented (Marks et al 1994, Bloom 1994, Sullivan 1992). Apparently selects nesting and roosting sites with dense, and occasionally armored, cover for either concealment from predators or to dampen thermal variation (Marks et al 1994, Marks and Yensen 1980). May roost communally.

Grasslands, meadows, active agricultural lands, fallow lands, sparse shrub-steppe, sagebrush scrub, and desert scrub habitats have been noted in close proximity to roosting and foraging stands (Bloom 1994, Hooper and Nyhof 1986, Kotler 1985, Marti 1974, Marti et al 1986, Thurow and White 1984). Wintering birds and migrants may be more opportunistic than breeding birds using a wide variety of roosting habitats near suitable foraging areas (Marks et al 1994).

Feeds primarily on microtine rodents of the genera *Microtus*, *Peromyscus*, and *Dipodomys* (Marks et al 1994). In California deserts, and desert areas in other parts of their range, kangaroo rats (*Dipodomys* sp.) are the primary prey (Bloom 1994, Johnson 1954, Marks et al 1994). The documented correlation between prey densities (*Microtus* sp.) and Long-eared Owl populations in Europe and Finland (Korpimäki 1992, Korpimäki and Norrdahl 1991, Village 1981) is less apparent in other parts of its range. Several studies refute dietary specialization to the degree that a predator-prey density relationship could be inferred and suggest this relationship is an artifact of absolute vole densities in northern latitudes (Canova 1989, Bull et al 1989, Maser et al 1970).

Threats

The primary factor impacting Long-eared Owl populations is breeding and foraging habitat degradation and loss (Marks et al 1994). As noted above, and contrary to the paucity of empirical evidence, perceived declines may be attributed to the direct and indirect effects of loss of grassland habitat in California, as in other grassland associated birds. Loss of nesting and roosting substrate is a decline factor in southern California (Bloom 1994) and likely a factor in areas where dense tree

cover is limited. Grinnell and Miller (1944) noted clearing of “bottomlands” for farming as a possible factor contributing to observed declines.

Loss of riparian habitat has been implicated as a decline factor elsewhere in the species range (Marks et al 1994) and could likely be a factor in California, especially in the Central Valley. In one case, disturbance at a nest site caused apparent nest abandonment (Marks and Yensen 1980); however several reproduction success and nest observation studies were conducted without abandonment (e.g., Thurow and White 1984). Marks et al (1994) concluded, based on lack of disturbance from proximity to roads and lack of difference in nesting success at disturbed and undisturbed nests (Marks 1986), that disturbance is probably not a decline factor.

Little information on contaminants. Henny et al (1984) noted elevated DDE in 12 raptor species tested in the Columbia River Basin, Oregon, including Long-eared owls, but noted levels below those suspected of causing reproductive harm. Bosakowski et al (1989) suggested rodenticide use may decrease prey populations impacting Long-eared Owl populations, but offered no evidence.

Nest predation, particularly by Ravens and other corvids, may be a factor contributing to local and regional declines. Bloom (1993) noted that increased raven populations in southern California may cumulatively effect reproductive success adding that none of the 69 historic Long-eared Owl nests were constructed by ravens as compared 29% percent of current (1993) nests of raven origin. This contrasts with observations by Grinnell and Miller (1944) in the northeast of the range coincident with the Black-billed magpie suggesting dependence on corvid nests for nesting substrate.

Management and Research Recommendations

Research should focus on determining California population trend and additional factors contributing to perceived decline. Study goals and objectives aligning with Bloom (1993) would assist in determining Central Valley and northeastern population trend status. Marks et al (1994)

suggests identification of reasons for migratory and year-round status of individuals from same population and area, nomadism and North American population relationship to microtine rodent population fluctuations, and investigation of often abrupt and long distance postnesting migrations as research priorities. Determination of breeding patterns and densities in the Central Valley and northeastern California would help identify conservation priority areas for the species.

Nest site loss could be partially mitigated by nest box provisioning (Glue 1977).

Consideration of the ecological and habitat requirements of this species, and the suite of declining grassland-associated species, in Habitat Conservation Plans (HCP), Natural Community Conservation Plans (NCCP), and other regional conservation planning efforts would likely result in reduced loss of nesting substrate and foraging habitat.

Monitoring Needs

The BBS is inadequate for monitoring this species and trend data from the CBC are inconclusive. Probably the best mode for regional monitoring of Long-eared Owl populations is through the Breeding Bird Atlas projects underway in several California counties.

Acknowledgments

Literature Cited

- Anonymous. 1992. Update to 1978 Bird Species of Special Concern list. Unpubl. Report of the Calif. Dept. of Fish and Game, Bird and Mammal Conservation Program, Sacramento, Calif. 1p.
- Bloom, P.H. 1994. The biology and current status of the Long-eared Owl in coastal southern California. Bulletin of the So. Ca. Academy of Sci. 93: 1-12.
- Bosakowski, T., R. Kane, and D.G. Smith. 1989. Decline of the Long-eared Owl in New Jersey. Wilson Bulletin 101: 481-485.
- Bull, E.L., A.L. Wright, and M.G. Henjum. 1989. Nesting and diet of Long-eared owls in conifer forests, Oregon. Condor 91: 908-912.
- California Department of Fish and Game. 2001. Special Animals. Unpub. Rpt. of the Wildlife and Habitat Data Analyses Branch, Sacramento, CA. 46 pp. + App

- Canova, L. 1989. Influence of snow cover on prey selection by long-eared Owls *Asio otus*. *Ethol. Ecology and Evol.* 1: 367-372.
- Duffy, K., and P. Kerlinger. 1992. Autumn owl migration at Cape May Point, New Jersey. *Wilson Bulletin* 104:312-320.
- Enriquez-Rocha, P., J.L. Rangel-Salazar, and D.W. Holt. 1993. Presence and distribution of Mexican owls: a review. *Journal of Rapt. Res.* 27: 154-160.
- Glue, D.E. 1977. Breeding biology of Long-eared owls. *British Birds* 70: 318-331.
- Grinnell, J., and A.H. Miller. 1944. The distribution of the birds of California. *Pacific Coast Avifauna* 27:138-139
- Henny, C.J., L.J. Blus, and T.E. Kaiser. 1984. Heptachlor seed treatment contaminates hawks, owls, and eagles of Columbia Basin, Oregon. *Raptor Res.* 18: 41-48.
- Hooper, T.D., and M. Nyhof. 1986. Food habits of the Long-eared owl in south-central British Columbia. *Murrelet* 67: 28-30.
- Houston, C.S. 1966. Saskatchewan Long-eared owl recovered in Mexico. *British Birds* 35: 2-8.
- Johnson, N.K. 1954. Food of the Long-eared owl in southern Washoe County, Nevada. *Condor* 56: 52.
- Knight, R.L., and A.W. Erickson. 1977. Ecological notes on Long-eared and Great Horned owls along the Columbia River. *Murrelet* 58: 2-6.
- Knopf, F.L. 1994. Avian assemblages on altered grasslands. *Studies in Avian Biology* 15:247-257.
- Korpimäki, E., and K. Norrdahl. 1991. Numerical and functional responses of Kestrels, Short-eared Owls, and Long-eared Owls to vole densities. *Ecology* 72: 814-826.
- Korpimäki, E. 1992. Diet composition, prey choice, and breeding success of Long-eared owls: effects of multiannual fluctuations in food abundance. *Canadian Jour. of Zool.* 70:2373-2381.
- Kotler, B.P. 1985. Owl predation on desert rodents which differ in morphology and behavior. *Journal of Mammology* 66: 824-828.
- Marks, J.S., D.L. Evans, and D.W. Holt. 1994. Long-eared Owl (*Asio otus*). In *The Birds of North America*. Editors: A. Poole and F. Gill. Number 211. The Academy of Natural Sciences, Philadelphia, and The American Ornithologists' Union, Washington, D.C. 16 pp.
- Marks, J.S. 1986. Nest site characteristics and reproductive success of Long-eared owls in southwestern Idaho. *Jurnal of Field Ornith.* 98: 547-560.
- Marks, J.S., and E. Yensen. 1980. Nest sites and food habits of Long-eared owls in southwestern Idaho. *Murrelet* 61: 86-91.

- Marti, C.D., and J.S. Marks. 1989. Medium-sized owls. Pp. 124-133 in B.G. Pendleton, ed. Proceedings of the Western Raptor Management Symposium and Workshop. Natl. Wildl. Fed. Tech. Series No. 12, Washington, D.C.
- Marti, C.D., J.S. Marks, T.H. Craig, and E.H. Craig. 1986. Long-eared owl diet in northwestern New Mexico. *Southwest Nat.* 31: 416-419.
- Marti, C.D. 1974. Feeding ecology of four sympatric owls. *Condor* 76: 45-61.
- Maser, C.E., E.W. Hammer, and S.H. Anderson. 1970. Comparative food habits of three owl species in central Oregon. *Murrelet* 51: 29-33.
- Randle, W., and R. Austing. 1952. Ecological notes on Long-eared and Saw-whet owls southwestern Ohio. *Ecology* 33: 422-426.
- Remsen, J.V., Jr. 1978. Bird Species of Special Concern in California; an annotated list of declining and vulnerable species. California Department of Fish and Game, Wildlife Management Branch Administrative Report (78-1):1-54
- Russell, R.W., P. Dunne., C. Sutton, and P. Kerlinger. 1991. A visual study of migrating owls at Cape May Point, New Jersey. *Condor* 93: 55-61.
- Sauer, J. R., Hines, J. E., Thomas, I., Fallon, J., and Gough, G. 2000. The North American Breeding Bird Survey, results and analysis 1966-1999. Version 98.1, USGS Patuxent Wildl. Res. Ctr., Laurel MD (<http://www.mbr-pwrc.usgs.gov/bbs/bbs.html>).
- Sauer, J. R., S. Schwartz, and B. Hoover. 1996. The Christmas Bird Count Home Page. Version 95.1. Patuxent Wildlife Research Center, Laurel, MD (<http://www.mbr.nbs.gov/bbs/cbc.html>).
- Shuford, W.D., and P.J. Metropulos. 1996. The Glass Mountain Breeding Bird Atlas project preliminary results, 1991 to 1995. Prepared for the U.S. Forest Service, Inyo Natl. Forest. Point Reyes Bird Observatory, Stinson Beach, CA.
- Sibley, C.G., and B.L. Monroe, Jr. 1990. Distribution and taxonomy of birds of the world. Yale Univ. Press, New Haven, CT.
- Slack, R.S., C.B. Slack, R.N. Roberts, and D.E. Emord. 1987. Spring migration of Long-eared owls and Northern owls at Nine Mile point, New York. *Wilson Bulletin* 99: 480-485.
- Sullivan, B.D. 1992. Long-eared owls usurp newly constructed American Crow nests. *Journal of Raptor Res.* 26: 97-98.
- Thurrow, T.L., and C.M. White. 1984. Nesting successs and prey selection of Long-eared owls along a juniper/sagebrush ecotone in southcentral Idaho. *Murrelet* 65: 10-14.
- Village, A. 1981. The diet and breeding of Long-eared owls in relation to vole numbers. *Bird Study* 28: 215-224.

